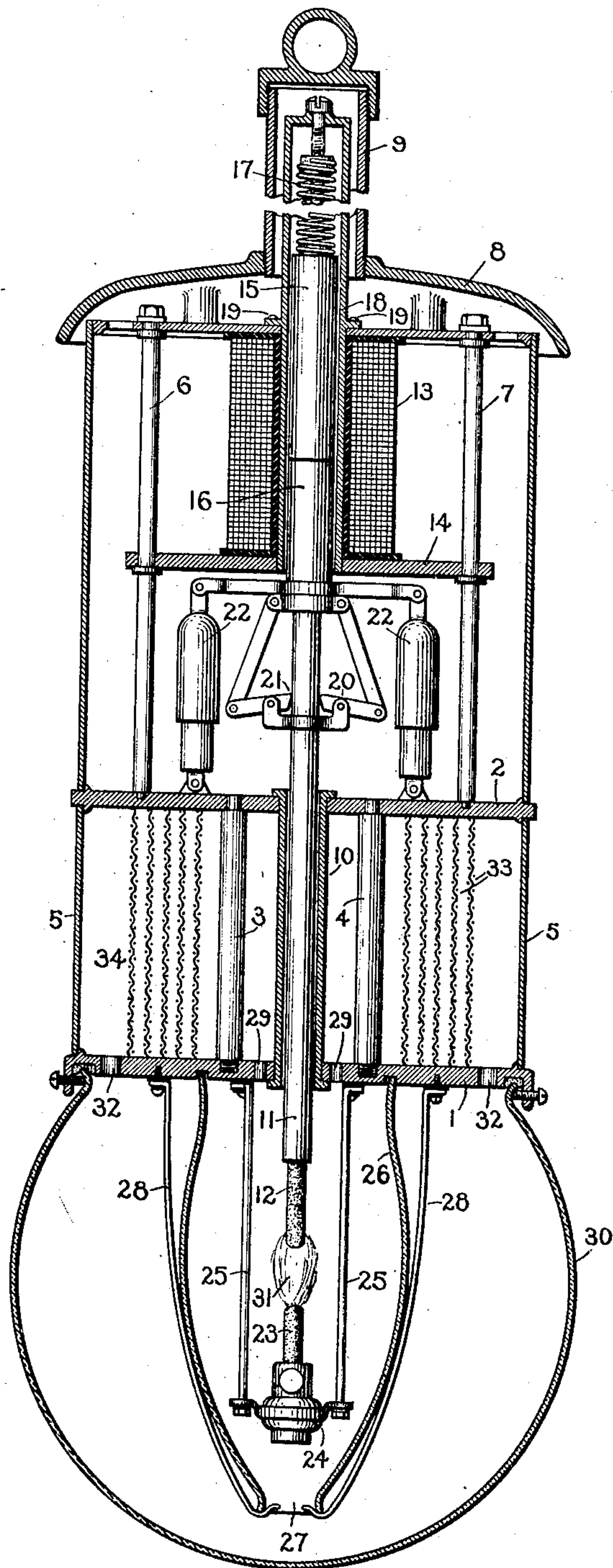


No. 892,768.

PATENTED JULY 7, 1908.

C. P. STEINMETZ.  
ELECTRIC ARC LAMP.  
APPLICATION FILED MAY 31, 1902.



Witnesses.

J. Ellis Glenn.  
Helen Orford

INVENTOR.  
Charles P. Steinmetz  
by *Alfred S. Davis*  
Att'y.



# UNITED STATES PATENT OFFICE.

CHARLES P. STEINMETZ, OF SCHENECTADY, NEW YORK, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

## ELECTRIC-ARC LAMP.

No. 892,768.

Specification of Letters Patent.

Patented July 7, 1908.

Application filed May 31, 1902. Serial No. 109,600.

*To all whom it may concern:*

Be it known that I, CHARLES P. STEINMETZ, a citizen of the United States, residing at Schenectady, county of Schenectady, State of New York, have invented certain new and useful Improvements in Electric-Arc Lamps, of which the following is a specification.

My present invention comprises means for directing the deposition of solid matter emitted by luminous or flaming electric arcs. If some such means as is hereinafter described is not employed the solid matter which is emitted by arcs of the character mentioned, and which appears in the form of smoke, is deposited upon the inclosing globe, thereby forming a coating which obscures the light to a greater or less extent. In accordance with my invention the solid matter is directed away from the arc-inclosing globe and is then removed or eliminated from the air currents which carry it. Discoloration of the inclosing globe or globes is thus prevented and one of the difficulties attendant upon the use of flaming arcs is thus removed.

The novel features which I believe are characteristic of my invention I have pointed out with particularity in the appended claims, while in the following specification which is to be taken in connection with the accompanying drawings will be found a detailed description of one embodiment of the many which my invention may assume.

The arc lamp represented in the drawings is intended for use on constant potential circuits and in the instance shown is of the shunt feed variety, that is to say, the electrodes of the lamp are normally urged apart by a spring or other mechanical device and are moved toward each other through the operation of a magnet shunted about the electrodes.

In the drawings, 1 and 2 represent plates forming a portion of the framework of a lamp. These plates are separated from each other and held in place by means of spacing rods of which two are indicated at 3 and 4 respectively. The space between these plates is such that when inclosed by the cylindrical casing indicated in section at 5, a chamber of moderate dimensions is formed. The upper plate 2 is suspended by means of rods such as 6 and 7 from the top plate 8 of the lamp. The parts thus described constitute the main framework of the lamp

from which the working parts are supported. The lamp as a whole is suspended by a tubular extension 9 screwed into the top plate of the lamp and provided at its projecting end with a ring or other attaching device. In the drawings this tubular extension is shown as partly broken away owing to lack of space to represent the full length of the extension in the drawings.

Located centrally with respect to the plates 1 and 2 is a tube 10 constituting a guide for the rod 11 which carries the upper electrode 12 of the lamp. This rod 11 is actuated by means of the solenoid 13 supported centrally in the lamp between the top plate 8 and a cross piece 14 carried by the vertical supporting rods 6 and 7. Within the opening in this solenoid is a tubular armature or core 15 of magnetic material in which slides the rod 11 carrying the upper electrode. To the lower portion of the core 15 is fastened a tubular member 16 of non-magnetic material carrying a clutch 20 arranged to engage the electrode rod 11 as indicated at 21.

The armature 15 with all the parts attached thereto is suspended from a helical spring 17, the upper end of which is fastened at the top of a tube 18 having a flange resting upon the top plate 8 of the lamp as indicated and secured in position by screws 19 or any other suitable means. A dash-pot or dash-pots 22 may be used to prevent too violent motion of the electrode-carrying rod 11 under the influence of current in the solenoid 13. The lower electrode 23 is supported in a holder 24 carried by rods 25 depending from the lower plate 1 of the lamp frame.

The arc which is formed between the electrodes is surrounded by a small inclosing globe 26 open at its lower end as indicated at 27 and maintained with its upper edge in close contact with the plate 1 by hooked wires 28 attached to the plate 1. The interior of this arc-inclosing globe communicates with the interior of the chamber 34 formed between the plates 1 and 2 and the cylindrical casing 5, this communication being afforded by means of a suitable number of openings in the lower plate 1, two of these openings being indicated at 29 in the cross sectional view of the plate 1. The arc-inclosing globe 26 is in turn surrounded by a spherical or other suitably shaped outer globe 30, the upper edge of which forms a fairly air-tight joint with



the plate 1 from which it is supported as indicated.

When the lamp is in operation the arc indicated at 31 heats the air immediately surrounding it and this air rises through the set of openings 29 into the chamber 34, thereby producing a draft up through the opening 27 at the lower end of the inner arc-inclosing globe. This draft causes air to be drawn from the chamber 34 through suitable openings, some of which are indicated at 32, down into the outer globe 30. The action described causes a continuous circulation of air from the inner arc-inclosing globe up into the chamber 34, then down from the chamber into the inclosing globe 30 and from thence into the inner inclosing globe and so on. This directed circulation of heated air from the arc permits the removal of solid matter emitted from the arc almost as soon as it is produced and for this purpose I make use of a series of screens 33 formed of wire gauze of moderately small mesh, these screens being located concentrically in the chamber 34. In the drawings these screens are indicated in cross section and as shown it will readily be seen that the air which is caused to circulate by reason of the heating action of the arc is forced to pass through these screens before returning to the chamber formed between the inner and outer globes 26 and 30. The solid matter given off by the arc in the form of smoke or vapor is thus deposited in the meshes of the screens, thereby preventing its deposition upon the arc-inclosing globe, the effect of which would of course be to seriously reduce the amount of light transmitted.

What I claim as new and desire to secure by Letters Patent of the United States, is,

1. The combination in an electric arc lamp, of means for creating within the lamp a circular air current carrying smoke and other products of combustion from the arc, and means for depositing said products at a predetermined point in the air circuit.

2. The combination in an electric arc lamp, of means for creating within the lamp a circular air current carrying smoke and other products of combustion from the arc, and a depositing chamber constituting a part of the air circuit.

3. The combination in an electric arc lamp, of means for creating within the lamp a circular air current carrying smoke and other products of combustion from the arc, and a filtering and depositing chamber within the air circuit.

4. The combination in an electric arc lamp, of means for creating within the lamp a circular air current carrying smoke and other products of combustion from the arc, a depositing chamber constituting a part of the air circuit, and filtering and depositing screens within said chamber.

5. The combination in an electric arc lamp, of means for creating in the lamp a circular air current carrying smoke and other products of combustion from the arc, and filtering and depositing screens located at a point in the air circuit.

6. The combination in an electric arc lamp, of an inclosing globe, means for creating through the globe a circular air current carrying smoke and other products of combustion from the arc and globe, and means for depositing such products outside the globe within the air circuit.

7. The combination in an electric arc lamp, of an elongated arc inclosing globe, a chamber distinct from the globe communicating with the latter at its two ends for the deposition of smoke and other products of combustion, and means for causing a circular air current through the globe and chamber.

8. The combination in an electric arc lamp of an elongated arc inclosing globe, a chamber distinct from the globe communicating with the latter at its two ends for the deposition of smoke and other products of combustion, means for causing a circular air current through the globe and chamber, and means contained in the chamber for promoting the deposition of arc products the same.

9. The combination in an electric arc lamp of a pair of electrodes in axial alignment, an elongated arc inclosing globe, and a chamber for depositing arc products of combustion in communication with the two ends of the elongated arc inclosing globe.

10. In an arc lamp, the combination of means for creating a recurrent circulation of a confined body of air and arc products of combustion along and over the arc, with a chamber remote from the arc through which the said circulation passes, for depositing products of combustion.

In witness whereof I have hereunto set my hand this 28th day of May, 1902.

CHARLES P. STEINMETZ.

Witnesses:

BENJAMIN B. HULL,  
HELEN ORFORD.